

UNIVERSITY OF CAPE TOWN

THESIS TITLE:

Determinants of voluntary or coerced sexual debut among Black African female adolescents in Soweto, South Africa: Findings from The Birth to Twenty Plus cohort study

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Part 0: Preamble

Declaration

I, **Nyemba Dorothy Chiwoniso (NYMDOR004)** hereby declare that the work on which this dissertation/thesis is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

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Date: August 2017

Dedication

I dedicate this thesis to my family – my husband; Takwanisa, sons; Tapiwa and Tawonga, Mum and Dad for your love, and for supporting me every step of the way. You are the best family anyone could ask for.

Thesis Abstract

Determinants of voluntary or coerced sexual debut among Black African female adolescents in Soweto, South Africa: Findings from The Birth to Twenty Plus cohort study.

Early sexual debut whether voluntary or coerced increases exposure to high risk sex which leads to unplanned pregnancy, sexually transmitted infections including HIV and reproductive health problems during adolescence. This study aims to examine the risk factors for age of sexual debut, either voluntary or coerced among Black African female adolescents from the Birth to Twenty cohort study in Soweto, South Africa.

Part A is the study protocol which outlines the rationale for conducting this study, study aim, research methodology, analysis plan and ethical considerations. Part B forms the literature review which gives a summary of the existing literature and provides context for the dissertation. The objectives of the literature review were to identify published literature on determinants of either voluntary or coerced sexual debut in adolescents and identify gaps for further research. Part C is the manuscript presenting the results and discussion on the implications of key findings.

The results showed that there are many Black African female adolescents who are engaging in early sexual debut and there is prevalence of coerced sexual debut among adolescents of similar age. Socio-economic status and maternal education were found to be significantly associated with coerced sexual debut. There is a need for interventions to delay sexual debut among young female adolescents from low socio-economic backgrounds and lower maternal education.

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Part A: Protocol

Purpose of the study

This study investigates the impact of selected socio-demographic and sexual behavioural factors on either voluntary or coerced sexual debut age among Black African female adolescents. We use longitudinal data from the Birth to Twenty Plus (Bt20) cohort conducted in Soweto, South Africa. We use information collected at 13-year wave up until 18-year wave.

Background

Early initiation of sexual intercourse whether voluntary or coerced increase exposure to high risk sex among adolescents which lead to unplanned pregnancy and sexually transmitted infections including HIV (Richter *et al.*, 2007). Early sexual debut is defined as having sexual intercourse at or before age of 14 years (Richter *et al.*, 2015). Many South African studies found that adolescents are initiating sexual activities at an early age (Manzini, 2001; Richter *et al.*, 2007; Pettifor *et al.*, 2009). Also, for adolescents, first sexual experiences are part of transition into adulthood (Rosenthal *et al.*, 2001). However, the time of marriage in South Africa is relatively late yet the time of first sex is occurring at an early age leaving a longer gap of sexual activities out of marriage, which is a source of concern for sexual and reproductive health (Bakilana, 2005).

Sexual coercion has been defined as an act of forcing someone against his or her will to agree to sex through violence, threats, verbal insistence, deception, cultural expectations or economical state (Heise *et al.*, 1995). Sexual coercion has been associated with risky sexual behaviours and psychological problems later in life (Maharaj *et al.*, 2007; Moore *et al.*, 2007). Several studies from South Africa have

shown prevalence of sexual coercion among adolescents (Maharaj *et al.*, 2007; Moore *et al.*, 2007; Richter *et al.*, 2015). In a 2007 study conducted in KwaZulu-Natal, 46% of the young women reported coerced first sexual encounter and they were Black South African adolescent girls living in an urban area (Maharaj *et al.*, 2007). This exposed them to high risk of HIV and high rate of unplanned pregnancies. In another study on sexual initiation and childbearing among adolescent girls in KwaZulu-Natal, South Africa, 66% of the girls reported that their sexual initiation was voluntary while 34% reported coerced sexual debut (they were either persuaded, tricked, forced or raped) (Manzini, 2001). Coerced sexual debut was common in girls aged 15-19 years and on average, adolescent girls had sex with males who were four years older than them (Manzini, 2001). Studies have found association between sexual coercion and age disparate relationships as older men tend to provide vulnerable young girls with financial support (Maharaj *et al.*, 2007; Chirinda *et al.*, 2012). Early sexual debut was identified as a factor that increases vulnerability to adolescent pregnancy, which is currently a key public health issue in South Africa (Toska *et al.*, 2015). Furthermore, early childbearing among this most vulnerable group has been linked to higher rates of maternal and child morbidity and mortality (Pettifor *et al.*, 2009).

Young women (15-19 years) have been identified as the most vulnerable group on their first and subsequent sexual experiences due to this period of transition into adulthood (Varga, 1997; WHO, 2006). Based on the recent South African National HIV Prevalence, Incidence and Behaviour Survey 2012 (HSRC), the prevalence of HIV in the adolescent age group 15-24 years in South Africa is an estimated 2.9% for males and 11.4% for females with a significantly higher prevalence in females starting in the 15-19 age groups. Females have HIV prevalence 3.9 times higher

than males and the results show that Black Africans have HIV prevalence 7.6 times higher than coloureds (excluding Whites and Indians with small numbers). All these figures show that Black African females in South Africa are a key population at higher risk of HIV exposure and that is why they are our population of interest for our study.

Factors which increase female adolescent's vulnerability to voluntary or coerced sexual debut include younger age at first sex, increasing partner age difference, less years of schooling, low parent educational level, unemployment, and low socio-economic status (Maharaj *et al.*, 2007). These factors can be driven by other societal factors such as societal norms which are in support of male superiority and sexual entitlement (Pettifor *et al.*, 2009). Other research have reported high levels of crime, such as rape and other forms of partner violence (Flisher *et al.*, 2007). Some of the adverse health consequences of voluntary or coerced sexual debut include increased risky behaviour later in adult life such as age-disparate sexual relationships, multiple sexual partners and unprotected sex (Koenig *et al.*, 2004). Consequently, improved understanding of how predisposing factors interact under different settings and context is important for determining effective responses. Our objectives are to examine determinants of voluntary or coerced sexual debut among Black African female adolescents in a South African township using a sub-sample data from the Bt20 prospective cohort.

Methodology

Study design

To address the study aim, we use a sub-sample of the Bt20 cohort data. Bt20 is a prospective longitudinal birth cohort conducted in Soweto, the largest urban township

in Johannesburg, South Africa. It is the largest and longest birth cohort in Africa that aims to assess the environmental, economic, psychosocial and biological determinants of health, development and well-being of children born in a South African urban township. The Bt20 took place when Birth to Ten which started in April 1990 closed down after 10 years of follow up in 2000 and a transitional phase was implemented to continue the study into a second 10 years follow up (Richter *et al.*, 2004). The cohort researchers intend to maintain the cohort up to third generation children (Richter *et al.*, 2007). Enrolment into the study started prior to delivery when pregnant women were interviewed during their third trimester while attending public antenatal clinics. The Bt20 includes singleton children born to women resident in Soweto-Johannesburg during the 7-week enrolment period from April 23 to June 8, 1990. The intention was to include all singleton children born during this enrolment period but for various reasons, some eligible children were not enrolled. The enrolled children had to remain in the area with the mother for at least 6 months post birth. 5447 births were registered during the 7-weeks enrolment period, 3273 of which met the selection criteria of continued residence in the area. The children and their families have been followed up more than 18 times between birth and 23 years of age, with approximately 2 300 children and their families (70%) remaining in contact with the study. The study has been described in detail in The Cohort profile (Richter *et al.*, 2007).

Characteristics of study population

The participants for this study are a sample of 908 black female adolescents in the Bt20 cohort in Soweto, Johannesburg, South Africa. We are using information gathered from when the girls were aged 13 years until 18 years. We selected

information from 13 years because collection of sexual behaviour measures started prior to the year the adolescents turned 13 years. The data we have is up to the end of the year that the adolescents turned 18 years. We selected Black African female girls who had not initiated in sexual intercourse at the age of 13 years. The majority of the participants in the Bt20 cohort are Black African children (78%) and there has been high attrition for Asians and Whites making it inadequate to test for ethnic differences (Richter *et al.*, 2007). Most studies on adolescent sexuality in South Africa have shown that Black African female adolescents are at high risk of early sexual debut and they are the group of interest in our study because they also reported coerced first sexual encounter (Maharaj *et al.*, 2007).

Recruitment and enrolment

We are using information gathered from a sample of 908 Black African female adolescents in the Bt20 study. The data was collected longitudinally at five points between 13 and 18 years of age. It is explained in the cohort profile that multiple strategies were used to maintain and contact participants in the Bt20 study through parents, primary caregivers and school principals (Richter *et al.*, 2007). The children in the cohort have grown older and there has been re-orientation to maintain this cohort of adolescent participants between data collection phases through use of birthday cards, regular newsletters, reports in newspapers, radio and television notices send out by research assistants.

Research procedure and data collection

Data collection comprised lengthy questionnaires, in-depth interviews and measures of special interest. Verbal questionnaires were administered face to face by trained

interviewers in a closed room to ensure privacy. Questionnaires were designed by several researchers and standardised instruments were used. Pilot studies were done on all the Bt20 questionnaires prior to data collection to establish reliability and validity. Questionnaires were translated to main South African languages after piloting. Interviewers and data collectors were trained on respective questionnaires prior each data collection wave. The training included general research issues, ethical conduct, topics on working with children, and administration of questionnaires. Questionnaires were completed by the caregiver of the child with assistance from trained interviewers. Information on risk behaviour was collected once when the participants turned 11-12 years and twice a year from when they turned 13 years. Information on sexual behaviour is considered sensitive for children and therefore the Bt20 study used self-administered questionnaires to collect data on sexual behaviour. Study participants spend on average 3-4 hours completing the questionnaires. Data collection is done at participant's home, school or study site.

Data safety and monitoring

All research assistants who conduct field work or data collection are trained in Good Clinical Practice (GCP) and ethical research conduct to ensure accuracy and reliability of the data. Several reliability assessments of the collected data were done and the information collected was used to design subsequent questionnaires to ensure reliability (Richter *et al.*, 2007). Sexual behaviour measures were self-reported responses submitted through a method of secret ballot (self-administered questionnaires) to ensure privacy, anonymity, self-disclosure and accuracy of the data. Sophisticated bar codes, filing and electronic systems are used for safe data

storage. All data sets for the Bt20 study are password protected and can only be accessed through formal agreement with the principle investigator.

Data analysis

Frequency distributions and relative frequencies will be used to describe the data. Chi-squared tests and Fishers exact tests will be used to identify significant association between categorical variables and p-values will be reported in conjunction with proportions and 95% confidence intervals. In addition, the Kruskal Wallis and Wilcoxon rank-sum tests will be conducted to compare medians for non-normally distributed numerical variables, and Analysis of Variance and t-tests will be conducted to compare the means for normally distributed numerical variance. We will use logistic regression to investigate odds ratios and associated significance.

Cox proportional hazards regression analyses will be conducted to examine the effect of potential risk factors on the time to sexual debut. Competing risks models using Fine and Gray method will be used to further investigate the effect of these risk factors on time to first voluntary sexual debut and time to first coerced sexual debut respectively (multiple event types). Stata statistical software (version 14) will be used to analyse the data (StataCorp., 2013).

Potential risks to participants

There is minimal potential risk attributable to participation in this study because the study does not carry any direct harm or risk to the general wellbeing of the participants.

Potential risks include

- Psychosocial distress resulting from in-depth questioning and interviews related to social support, measures of behavioural and psychosocial information
- Psychological distress during the in-depth interviews
- There are potential risks should loss of confidentiality occur during study procedures in the process of data collection or participant follow-up.

To address and minimize potential risks listed above, the research assistants were trained in appropriate interviewing techniques, acknowledging signs of psychosocial distress of different types. Interviews were carried out at the participant's home, school or at the study site in a private room to assure privacy and confidentiality. Trained personnel were used to take measurements of interest such as fasting urine and blood draws. All parents or caregivers and the adolescent participants were informed of the above mentioned risks before the informed consent process and the strategies in place to minimize the probability of occurrence.

Direct benefit

A potential direct benefit for taking part in this study, particularly on sexual and lifestyle risk is that participants were screened voluntarily for HIV and STIs by trained personnel. Those with positive results were immediately referred for treatment. There were counselling services available for all the adolescent participants in the Bt20 cohort. Given the high risk of STIs morbidity in adolescents and need for counselling services, this benefit considerably outweighs any risks associated with participation in the study.

Indirect benefits

The Bt20 cohort study has been a source of reference for many policy decisions in South Africa particularly the Ministry of Health on tobacco legislation and Ministry of Education on age for school enrolment (Richter *et al.*, 2007). This study on determinants of voluntary or coerced sexual debut among Black African female adolescents in the Bt20 cohort will provide a base knowledge for intervention programs on adolescence health. This will be helpful in identifying health gaps for programs on health promotion, health education and strategies for motivating health behaviours in South African adolescents. The results of the study will be presented to Human Sciences Research Council (HSRC), South Africa.

Compensation

The Bt20 study did not offer any financial benefits to the participants and parents or primary caregivers. Compensation of R50 was provided to families who come to the study sites for data collection as transport cost. Refreshments were provided for the length of the stay at the study site. The research assistants provided letters to schools explaining absence of the child at school. There has been an initiative to shift data collection to weekends to make it more convenient for caregivers and adolescents to visit the study site.

Ethical consideration

Informed consent

Ethical approval for The Bt20 was obtained from the Human Research Ethics Committee of the University of Witwatersrand in Johannesburg. The study was conducted adhering to ethical principles stated in the Declaration of Helsinki. The study was also guided by ethical principles in the Belmont Report, namely those of

respect for persons, beneficence and justice. Ethical clearance for each data collection wave was obtained from the University of Witwatersrand. Preceding to the commencement of the study, written informed consent was obtained from the interviewed pregnant women. The interviewers were trained on informed consent process. As part of the informed consent process, interviewers explained the research process and the procedure that was going to be conducted. They also emphasized that participation was voluntary and could be withdrawn from the study at any time without any consequence. The interviewers explained that participating or not participating in the study had no effect on standard of care health services. Interviewers had to ensure that the parents/caregivers or the participants themselves understood the research process and the informed consent process. If the parent or caregiver could not read or write then the informed consent process was explained verbally and a verbal consent was given in the presence of an independent witness. Telephone consent was also obtained in the event that a child participant (below 18 years of age) was not accompanied by a caregiver. All parents and caregivers provided written informed consent on all data collection phases before the participants turned 18 years of age. The adolescent participants gave their assent on all waves from 13 years and before they turned 18 years and their consent once they had turned 18 years of age. Ethical approval for this study was obtained from the Human Research Ethics Committee of the University of Witwatersrand in Johannesburg (certificate number: M010556).

Privacy and confidentiality

Confidentiality has been preserved throughout the study. All data collection was done in a closed room at the participant's home, school or study site. All interviewers

were trained in Good Clinical Practice (GCP) and ethical research conduct to ensure that they uphold confidentiality on all study information. Confidentiality was maintained by assigning families and participants unique identification numbers that are known only to the data management team, and stored separately from the data sets. Sophisticated bar codes, filing and electronic systems are used for safe data storage. All data sets for the Bt20 are password protected and can only be accessed through formal agreement with the principle investigator.

The following steps were taken to minimize the risk of any loss of confidentiality throughout study design and conduct:

- All our personnel involved in data collection and management went through training on protecting human research participant through GCP and ethical research conduct.
- Participants enrolled into the study were given identification numbers to anonymise all data sets.
- All study documentation were kept in locked cupboards accessible only to the study coordinators and principle investigators at study sites.
- Sophisticated electronic system is used for all electronic study records and all data sets kept in password-protected files and all electronic communications of study data is done with password-protected files.

Dissemination of research findings

The proposed study will be submitted as a mini-dissertation in partial fulfilment of the requirements for Masters in Public Health degree at the University of Cape Town. The findings of the study will be reported back to HSRC, South Africa. A publishable

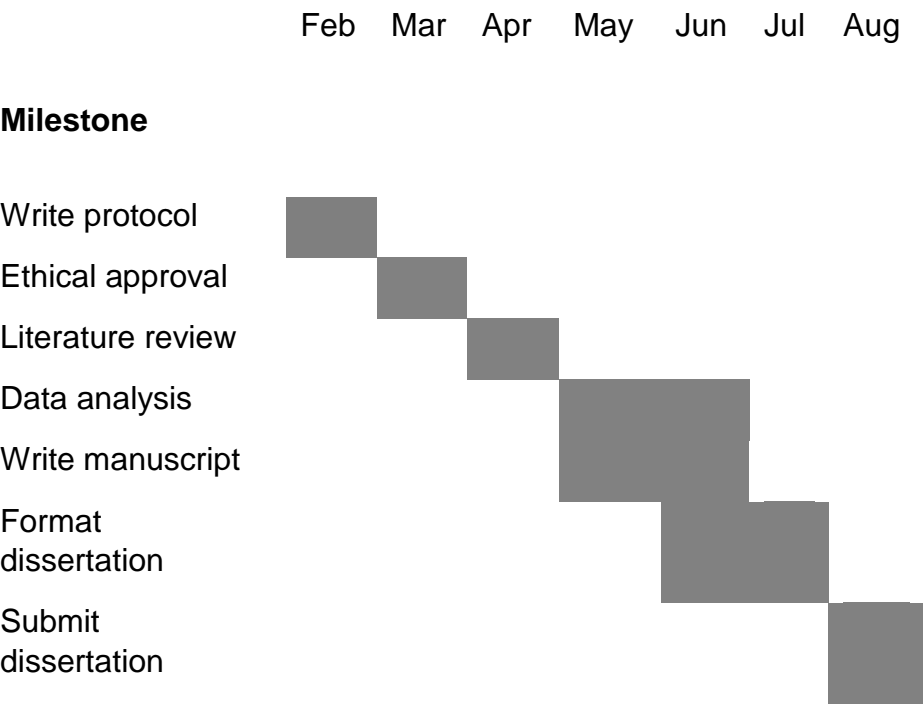
manuscript describing the findings of this study will be prepared for submission to a relevant peer reviewed journal for publication.

Logistics

Budget and Costs

This study is using secondary data from the Bt20 study, therefore there is no funding required for analyses of the pre-existing dataset.

Timeline for dissertation completion



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Part B: Literature Review

Background

This thesis investigates the effect of selected socio-demographic and associated risk factors on either voluntary or coerced sexual debut among Black African female adolescents. We look for determinants of sexual debut among Black African girls in Soweto, South Africa, using longitudinal data from the Birth to Twenty (Bt20) cohort for young adolescents from the 13-year wave up to the 18-year wave. Depending on whether the sexual debut is voluntary or coerced, we further explore the impact of potential risk factors on the time to: a) first voluntary sexual debut and, b) time to first coerced sexual debut, respectively.

Aim and Objectives

The aim of this literature review is to explore what is already known about the sexual debut of adolescents. We review previous studies to place our proposed study into the context of up to date evidence. Although this study focuses on Black African female adolescents in Soweto, South Africa, the review draws literature from other global and sub-Saharan Africa studies. Furthermore, the aim of the literature review is to critically appraise those selected studies regarding quality and stated inclusion criteria so as to identify gaps or areas that need further research.

The objectives of the structured literature review are as follows:

1. To identify published literature regarding determinants of either voluntary or coerced sexual debut in adolescents.
2. To assess and report on the quality and results of the identified studies by critically appraising the findings
3. To synthesize the findings and identify gaps where further research would be helpful

Search Method

An online search was conducted in PubMed, Medline and Google Scholar to identify relevant literature for this review. The key words listed in Box 1 were used in various combinations. An additional manual search of reference lists from relevant selected articles was also conducted using the search terms listed in box 1. A general search was done on web pages of international organisations such as World Health Organisation (WHO), United Nations (UNICEF and UNAIDS) for international reports on adolescents' health. Some reports and publications were retrieved from the South African National and Provincial Department of Health web pages.

Box 1: Search terms

Search strategy keywords

Adolescents, teenage, young people or young adults

Sexual debut, sexual initiation, sexual intimate, sexual intercourse
or risky sexual behaviour

Inclusion and exclusion criteria

The search was restricted to English language publications and reports. Priority was given to literature published in the past 10 years (January 2007 to January 2017) using data collected with a termination date not later than the year 2000. All study designs were included, restricted to studies conducted in South Africa and similar settings in sub-Saharan African countries. The outcome of interest is first sexual intercourse. The literature review however restricted to studies conducted on adolescents in the age range of 12 to 19 years old.

Global adolescents' health

The World Health Organization (WHO) defines adolescents as young people between the age of 10 and 19 years old. It is estimated that around 1 in 6 persons in the world is an adolescent (WHO, 2014b). Adolescence is an intermediate stage marked by physical, psychosocial and intellectual developments. This is the period which prepares young people for adulthood through transition from dependence on parents or guardians into independent decision making. The adolescence period also generates anxiety among parents or guardians of adolescents as they try to consider appropriate and best ways to assist young people facing sexual maturation (Bankole *et al.*, 2007). Adolescence is characterized by experimental activities as young people seek independence and identity. Unfortunately, this is also the time when some engage in risky behaviours such as initiation into sexual activities, alcohol and drug use, unhealthy diet and physical inactivity (WHO, 2014b). Young people in their teenage years confront choices that have consequences to their health later in life. Therefore, adolescent health has become an important global focus with the aim to achieve worldwide targets on maternal health, child mortality and HIV/AIDS (Kuruvilla *et al.*, 2016).

Sexual and reproductive health for adolescents

In South Africa, sexual and reproductive health for adolescents has become one of the top objectives for the Department of Health. They have come up with a National Adolescent & Youth Health Policy 2016-2020, which focus on offering comprehensive sexual and reproductive health to adolescents in effort to delay sexual debut and prevent STIs and HIV infections (Department of Health, 2016). As of 2016, HIV prevalence in South Africa was around 13% with a high rate of new infections among Black African females of age 15 to 24 years (Statistics South

Africa, 2016). However, there has been a decline in new HIV infections with delaying sexual debut as one of the attributing factors (UNAIDS, 2015). Nevertheless, new HIV infection is still a source of concern in the South African public health and a lot of emphasis on delaying sexual debut remains an important focus for HIV prevention among adolescents (Shisana *et al.*, 2014). The National Youth Policy of South Africa for 2009-2014 highlighted that the key health challenges faced by young people are teenage pregnancy, maternal mortality, reproductive and sexual health, HIV/AIDS and non-communicable diseases (National Youth Commission, 2009). HIV/AIDS has remained the major cause of morbidity and mortality among adolescents in Sub-Saharan Africa and in South Africa (WHO, 2014a). All these health challenges are elevated by sexual risk behaviour among adolescents hence the need to identify factors which accelerate an early initiation into sexual intercourse.

Black African female adolescents in South Africa

Young adolescents in Sub-Saharan Africa are one of the populations at high risk of HIV exposure (UNAIDS, 2015), with considerably higher HIV prevalence among young females in South Africa (Shisana *et al.*, 2014). Black African females in South Africa have been identified as a key population at higher risk of HIV infection and they have early sexual debuts which elevate the risk of unplanned teenage pregnancy and STI. Several studies found that Black African girls are more likely to engage in early sexual debut compared to boys (Moore *et al.*, 2007; Richter *et al.*, 2007; Pettifor *et al.*, 2009; Zuma *et al.*, 2011). In addition, teenage pregnancy continues to be a source of concern in South Africa as it leads to sexual and reproductive health needs (Otwombe *et al.*, 2015; Jonas *et al.*, 2016). Similarly, unplanned pregnancy and high STIs prevalence have been significant among the

Bt20 adolescents (Richter *et al.*, 2007). Early sexual debut was reported by some very young people, especially Black African girls younger than 13 years and there were reports of sexual coercion among adolescents in the Bt20 study as well (Richter *et al.*, 2015).

Sexual risk behaviour in adolescents

Sexual risk behaviour, which is one of the experimental activities initiated by adolescents, is defined as any behaviour that increases a person's risk of unintended pregnancy and sexually transmitted infections (STIs) including human immunodeficiency virus (HIV) infection (WHO, 2014b). Sexual risk behaviours among adolescents include early age at sexual debut, multiple sexual partners, unprotected sexual intercourse and having sexual intercourse while under influence of alcohol or drugs (Bankole *et al.*, 2007). We will elaborate in detail and focus mainly on early age at sexual debut in following sections.

Age of sexual debut

Early sexual debut defined as having sexual intercourse at or before age of 14 years (Richter *et al.*, 2015), is still a health threat globally and particularly in South Africa given the high prevalence of HIV among adolescents in the country (Shisana *et al.*, 2014). Early initiation of sexual intercourse, whether voluntary or coerced, increases exposure to high risk sexual behaviours among adolescents and this can lead to unplanned teen pregnancy and STIs including HIV (Richter *et al.*, 2007).

In 2004, an estimated 8% of young adolescent girls aged 12-14 years and 19% of young adolescent boys aged 12-14 years had already initiated in sexual intercourse across four countries in Sub-Saharan Africa (Bankole *et al.*, 2007). This is consistent with the study of Doyle and colleagues who used the Demographic Health Surveys

(DHS) and the AIDS Indicator Surveys (AIS) for 2000-2010 to describe the sexual and reproductive behaviour of adolescents aged between 15 to 19 years old in sub-Saharan Africa (SSA). This analysis of data from 24 SSA countries showed a wide variation in the proportion of adolescents of age 15-19 years who reported having early sexual debut (Doyle *et al.*, 2012). Some of the countries had large proportions of about 27% of the adolescents who had already engaged in sexual intercourse by age 15 years. All these studies highlight that there are substantial proportions of young adolescent who are experiencing early sexual debut in sub-Saharan Africa.

In a nationally representative survey of 2003 in South Africa among youths aged 15-24 years, 18% males and 8% females had engaged in first sexual intercourse at age 14 or younger (Pettifor *et al.*, 2009). In the age category 15-19 years, almost 50% of adolescents reported ever having had sex which is relatively high compared to the figures from sub-Saharan Africa stated above. This is consistent with another study of 2011 in South Africa which found a higher proportion of males (18%) who had early sexual debut compared to 6.9% females (Chirinda *et al.*, 2012). Among adolescents in Cape Town attending high school between March 2004 to May 2005, a high sexual debut was noted among 13 year olds with 13% of girls and 31% of boys having had sex over a follow up period of 15 months (Mathews *et al.*, 2009). The mean age at first sexual intercourse for the combined sample was 14 years.

The Botsha Bophelo Adolescent Health Study was another cross-sectional survey done between 2010 and 2012 among adolescents of age between 14-19 years in Soweto, South Africa. In this study, 55% of the adolescents reported early sexual debut with more males (64%) than females (49%) (Otwombe *et al.*, 2015). In the Birth to Twenty Plus study, 14% females and 38% males had engaged in sexual intercourse by age 15 years and the median age of sexual debut was 16 years for

females and 15 years for males (Richter *et al.*, 2015). There has been substantial interest globally to understand why adolescents initiate sexual activities at an early age so as to motivate development of effective interventions to delay sexual debut (Buhi *et al.*, 2007).

Risks from Early sexual debut

Early sexual debut has been found to be associated with several risk factors among young females namely high HIV risk profile (Zuma *et al.*, 2011), teenage pregnancy , coerced sex (Maharaj *et al.*, 2007; Mathews *et al.*, 2009; Pettifor *et al.*, 2009), transactional sex (Chirinda *et al.*, 2012; Stern *et al.*, 2014), multiple lifetime partners (Pettifor *et al.*, 2009; Zuma *et al.*, 2010) and uncompleted education (Mathews *et al.*, 2009; Zuma *et al.*, 2011; Chirinda *et al.*, 2012). Studies have shown that adolescents who initiate into sexual activities early are likely to engage in risky sexual behaviours later in adult life such as multiple sex partners (Maharaj *et al.*, 2007; Pettifor *et al.*, 2009; Otworld *et al.*, 2015). In South Africa, even though adolescents experience sexual debut at an early age, there is a relatively late age to marriage leaving a big gap between sexual debut and age to marriage (Bakilana, 2005). Initiating sex at an early age implies that one would spend more years of life with a much higher risk of STIs and HIV infection (Richter *et al.*, 2007). It is evident and worrisome to note that adolescents are engaging in sexual activities at an early age. It is important to have a good understanding of factors associated with sexual debut among adolescents given that early sexual debut is a potential risk for reproductive and sexual health problems. Also given the extremely high HIV prevalence among young females in South Africa, early sexual debut thus raises particular challenges to adolescent health.

Determinants of early sexual debut

Social cognition and Cultural norms

First sexual activity in adolescents is considered as a transitional experience into adulthood and can be influenced by the environmental and cultural context to which young people are exposed (Pettifor *et al.*, 2009). In an analysis using three rounds of Nigerian DHS/AIS surveys from 2003 to 2013, the results supported the notion that social and cultural contexts are determinants of adolescents sexual behaviour although casual inference cannot be drawn because of the snapshot nature of cross-sectional studies (Odimegwu *et al.*, 2017). Studies conducted among adolescents in South Africa between 1990s to 2000s described successful masculinity as having multiple sex partners (Maharaj *et al.*, 2007; Pettifor *et al.*, 2009). Social norms made it acceptable for males to establish control over females through initiating when to have sexual intercourse and when to exercise protected sex through use of condom (Maharaj *et al.*, 2007). Cultural and gender norms considered physical and sexual violence over female partners acceptable behaviours for masculinity success (Pettifor *et al.*, 2009).

Social cognition theories on behaviour used in psychology holds that portions of an individual's knowledge acquisition can be directly related to observing others within the context of social interactions, experiences, and outside media influences (Wubs *et al.*, 2015). In South Africa, Wubs and colleagues found that individual beliefs, attitudes and self-efficacy are important factors for predicting intentions of sexual debut. This is consistent with findings from another study that attitude and social norms are correlated with intentions to abstain from sex (Eggers *et al.*, 2016). A

study in Nigeria also found results reflecting that social and cultural contexts are primary determinants of adolescents sexual behaviour (Odimegwu *et al.*, 2017).

Peer pressure

Young adolescents are considered to be vulnerable to peer pressure to have sexual intercourse from friends and peer pressure may also promote high risk sexual behaviours. Having sexually active peers was found to be a determinant for first sexual initiation with a six times greater probability compared to those with peers not sexually active (Potard *et al.*, 2008). Studies indicate that male adolescents have more pressure to have a sexual relationship than girls and this direct pressure is a risk factor for first sexual intercourse (Potard *et al.*, 2008; Selikow *et al.*, 2009). Seeking an identity and belonging to a group is particularly important to children in the adolescent stages of their lives. Some male and female adolescents may engage in first sexual intercourse to feel a sense of belonging to a group (Potard *et al.*, 2008). However, a systematic review investigating the association of peer pressure and sexual debut found mixed and inconsistent results (Fearon *et al.*, 2015), concluding that there is need for further research with objective or biological outcomes as opposed to self-reported sexual behaviour outcomes.

School enrolment

School enrolment has been considered protective from transition to first sexual intercourse (Mathews *et al.*, 2009). Using qualitative data from 2004 in-depth interviews which was part of DHS, it was shown that young girls in school are more likely to abstain from sexual activities to prevent pregnancy so that they will not be suspended from their schooling (Moore *et al.*, 2007). Several studies in South Africa

have found that lower level of education for the adolescents is correlated to early sexual debut (Mathews *et al.*, 2009; Peltzer, 2010; Chirinda *et al.*, 2012).

Partner age difference

High rates of HIV infection among young women in South Africa and an increased number of unintended pregnancies have been attributed to age disparate sex. Age disparate sex is defined as sexual partnership between an adolescent (15-24 years) and a partner where there is an age difference of 5 or more years. A South African study conducted in 2003 found that young females are less likely to have used condom at first sexual intercourse when involved with a sexual partner who is 5 or more years older (Pettifor *et al.*, 2009). Furthermore, girls who experience coerced sexual debut due to age disparate sex are more likely to have not used condoms in their first sex (Maharaj *et al.*, 2007), and they become less confident to convince their subsequent partners to have protected sexual intercourse. For some of these young women, the age difference is also accompanied by financial benefits which then hinders their ability to negotiate for protected sex (Zuma *et al.*, 2011; Stern *et al.*, 2014).

In a study using the DHS/AIS surveys of 2000-2010 from 24 SSA countries, 13% of 15-19 years old girls from Zimbabwe who had engaged in sexual intercourse had a sexual partner 5 or more years older (Doyle *et al.*, 2012). This age-disparate sex was significantly higher among urban female adolescents compared to rural female adolescents. In South Africa, in 2012 it was found that 20% of adolescents aged 15-19 years engaged in age-disparate relationships with a sexual partner more than five years older (HSRC, 2012). Of interest in the HSRC report was the finding that 34% of female adolescents reported having had a partner more than five years senior

compared to 4% of male adolescents. A longitudinal study of 1130 sexually active young women aged between 14-24 years in Kwa-Zulu Natal, South Africa observed that the average age of partner at their first sex experience was three years older with age of partners ranging from 12 to 45 years (Maharaj *et al.*, 2007). All these studies have shown that age difference between partners has significant impact on the ability to negotiate sexual interactions, especially young women. There is need for further investigation on the association between either voluntary or coerced sexual debut and age difference and characteristics of first sexual partner.

Parenting and household characteristics

Orphans are considered to be at risk of being forced into sex and early sexual activity due to living arrangements or having sex in exchange for support. The overall prevalence of orphan hood in South Africa as of 2012 was around 17% with a higher percentage among Black Africans (Shisana *et al.*, 2014). The lack of parental supervision and support is found to be associated with risk of early sexual debut (Moore *et al.*, 2007; Chirinda *et al.*, 2012). Adolescents from homes with weaker or no parental/guardian supervision were found to have first sexual intercourse earlier compared to those with strong parental supervision (Mathews *et al.*, 2009). Furthermore, adolescents living in large households and female or child-headed families may have less supervision and experiment in sexual activities earlier without being noticed (Okigbo *et al.*, 2015).

In South Africa, young women who reported staying with fathers were more likely to engage in early sexual debut compared to those staying with their mothers (Chirinda *et al.*, 2012). Although adolescents expect to acquire reliable knowledge about sex from parents/guardian, it is found that they have little access to knowledge from adults concerning sexual activities and they end up relying on information from peers

(Selikow *et al.*, 2009). Such peer pressure may impact more strongly on girls than on boys. For example, in Kenya, among 12-19 year olds, there was evidence that strong parenting and communication was associated with delay of sexual debut where among adolescents who remained virgins, 99% of the females and 97% of the males were living with at least one parent (Okigbo *et al.*, 2015).

Crime, violence and substance abuse

Violence is considered a direct and strong predictor of sexual debut. In several studies on sexual debut, some of the adolescents who reported early first sexual intercourse also reported partner violence and sexual coercion at first sex (Mathews *et al.*, 2009; Pettifor *et al.*, 2009; Richter *et al.*, 2015; Wubs *et al.*, 2015). Sexual coercion has been defined as an act of forcing someone against his or her will to agree to sex through violence, threats, verbal insistence, deception, cultural expectations or economical state (Heise *et al.*, 1995). A study conducted in Kwa-Zulu Natal in 2001, found that 46% of sexually active young women aged 14-24 years had experienced a form of sexual coercion at first sexual intercourse (Maharaj *et al.*, 2007). In a 2005 randomized controlled trial of 12-14 year old high school students in Cape Town, 36% of adolescents who reported being victims of physical violence from intimate partners at baseline, reported having been forced to first sexual intercourse by second follow-up compared to a proportion of 19% for those who were not victims of physical violence from intimate partners at baseline. The same study found that the incidence of violence over a period of one year for the adolescents who experienced sexual debut ranged from 30% to 50% (Wubs *et al.*, 2015). Several studies show that female adolescents who experience coerced sexual debut have a higher risk of having unintended pregnancies, miscarriages, unsafe abortions, STI/HIV infections and reproductive complications later in life.

(Richter *et al.*, 2004; Maharaj *et al.*, 2007; Pettifor *et al.*, 2009).. There is evidence that some of the adolescents who engage in sexual intercourse earlier report coerced sexual debut (Moore *et al.*, 2007; Mathews *et al.*, 2009; Pettifor *et al.*, 2009; Richter *et al.*, 2015; Wubs *et al.*, 2015).

In conclusion, there are few studies that have looked at experience and determinants of coerced sexual debut in Sub Saharan Africa and particularly in South Africa. A lot of studies in South Africa found evidence of early sexual debut in South Africa (Moore *et al.*, 2007; Mathews *et al.*, 2009; Pettifor *et al.*, 2009; Zuma *et al.*, 2010; Chirinda *et al.*, 2012; Richter *et al.*, 2015; Wubs *et al.*, 2015). Most of these studies investigated on the prevalence of early sexual debut and associated risk factors. Some of these studies had limitations of temporality on determinants of early sexual debut because they used cross-sectional surveys and retrospective recall of sexual history (Chirinda *et al.*, 2012; Stern *et al.*, 2014). Some of the studies only enrolled school going adolescents who may not be representative of all adolescents (Mathews *et al.*, 2009; Peltzer, 2010; Wubs *et al.*, 2015). Nevertheless, little is known about the risk factors for coerced sexual debut hence the need for further research. A more detailed analysis of the listed determinants of voluntary and or coerced sexual debut is required to come up with informed and appropriate intervention programs aim at delaying adolescent's sexual debut and young females from unwanted sexual situations. The longitudinal data from the Birth to Twenty (Bt20) cohort for young adults aged 13-18 years can help in filling this gap.

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Part C: Manuscript

Manuscript cover page

Determinants of voluntary or coerced sexual debut among black female adolescents in Soweto, South Africa: Findings from the Birth to Twenty (Bt20) cohort study.

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Tables: 4

Figures: 2

The target journal used to guide this manuscript formatting is The South African Medical Journal (SAMJ).

The following deviations from journal requirements have been made in keeping with instructions for the mini-dissertation.

1. Figures and tables have been inserted in the text of the dissertation rather than attaching in the appendix.
2. A word count of more than 4000 words.

Abstract

Background: Early sexual debut whether voluntary or coerced increases exposure to high risk sex which leads to unplanned pregnancy, sexually transmitted infections including HIV and reproductive health problems during adolescence. Black African female adolescents in South Africa have been identified as a key population at increased risk of coerced sexual debut and HIV.

Objective: We examined the impact of selected predisposing risk factors on the age at sexual debut, either voluntary or coerced.

Methods: We used sample data from 908 Black African female adolescents collected longitudinally from the Birth to Twenty cohort in Soweto, South Africa, between 13 and 18 years of age. Sexual behaviour measures were collected and our primary outcome was sexual debut, and whether voluntary or coerced. We used logistic regression to investigate odds ratios and the associated significance. Cox Proportional Hazards regression analysis was conducted to examine the effect of potential risk factors on the time to overall sexual debut. We further explored the effect of these risk factors on time to first voluntary sexual debut and time to first coerced sexual debut respectively (multiple event types) using the Fine and Gray competing risks method.

Results: Approximately 41% of the sample had experienced sexual debut by 18 years of age; 78% of these sexual debut experiences were voluntary while 18% were coerced and 4% were undisclosed. Coerced sexual debut was 2.6 (95% CI: 0.9; 7.7) times more likely to occur in adolescents with partners of the same age than adolescents who initiated sex with age-disparate partners ($p = 0.08$). The overall median age at sexual debut was 18 years. High socio-economic status was

protective of the hazard to experience coerced sexual debut (hazard ratio = 0.23). Secondary level for maternal education had a reduced hazard of 0.37 on experience of coerced sexual debut.

Conclusion: There is a need for interventions to delay sexual debut among black female adolescents from low socio-economic backgrounds and lower maternal education. Interventions should target coercion between peers and partners of similar ages in South African adolescents from poor communities.

Keywords: adolescents, early sexual debut, voluntary, coerced, age of sexual debut, sexual and reproductive health

Introduction

Adolescent health, particularly sexual and reproductive health has become a top priority globally as well as in South Africa. Worldwide, 17% of the population are estimated to be adolescents. Global health targets are focused to improve the health of adolescents through strategies that combat issues in maternal health, child mortality and HIV/AIDS (Kuruvilla et al., 2016). Young females in Sub-Saharan Africa are one of the populations at high risk of HIV exposure. HIV/AIDS has remained the major cause of morbidity and mortality among adolescents in Sub-Saharan Africa and in South Africa (WHO, 2014). Teenage pregnancy is another source of concern in adolescent health in South Africa as it leads to sexual and reproductive complications (Jonas et al., 2016).

Early sexual debut, defined as having first sexual intercourse at or before age of 14 years (Richter et al., 2015), is a challenge world-wide and particularly in South Africa. Several studies in South Africa found out that young adolescents are engaging in sexual intercourse at an early age, younger than 13 years (Chirinda et al., 2012, Fearon et al., 2015, Mathews et al., 2009, Peltzer, 2010, Richter et al., 2015, Zuma et al., 2011). Early sexual debut is a health threat because it has been found to be associated with several risk factors among young females namely high HIV risk profile and multiple lifetime partners (Pettifor et al., 2009, Zuma et al., 2011). Teenage pregnancy and uncompleted education are other risks factors associated with early sexual debut (Chirinda et al., 2012, Mathews et al., 2009). There is evidence that some young adolescents in South Africa experience coerced sexual debut and transactional sex (Maharaj et al., 2007, Mathews et al., 2009, Pettifor et al., 2009).

Sexual coercion is defined as an act of forcing someone against his or her will to agree to sex through violence, threats, verbal insistence, deception, cultural expectations or economical state. Sexual coercion has become a public health issue due to its association with adverse health consequences such as risky sexual behaviours and psychological problems (Maharaj et al., 2007, Moore et al., 2007). An association has been found between sexual coercion and sexual harassment which is mostly an indicator of gender oppression. Orphanhood and low socio-economic status are factors which expose young female adolescents to a higher risk of coerced sexual debut. Studies have found that perpetrators of coerced first sex are mostly older men as they provide vulnerable young girls with favours in the form of financial support in exchange for sex (Maharaj et al., 2007). However, previous Birth to Twenty study results indicate sexual coercion between same aged partners of about 28%((Richter et al., 2015). These findings are consistent with findings from a study on coerced first sex among adolescent girls in Sub Saharan Africa, where some young girls in relationships with same aged boys reported coerced first sexual intercourse (Moore et al., 2007).

To develop effective interventions to delay sexual debut, it is essential to understand why female adolescents initiate sexual activities at an early age (Buhi et al., 2007). Encouragingly, there has been a decline in new HIV infections attributed to delayed sexual debut of sub-Saharan Africa adolescents who had received school based sex education (UNAIDS, 2015). However, most studies on early sexual debut have been descriptive and not from a longitudinal perspective (Chirinda et al., 2012, Maharaj et al., 2007, Moore et al., 2007, Peltzer, 2010, Pettifor et al., 2009, Zuma et al., 2011). This study aims to examine the impact of selected risk factors on the age of sexual debut, either voluntary or coerced, from a prospective longitudinal data among a

large sample of young Black African females participating in the Birth to Twenty Plus cohort.

Objective

The aim of this study is to identify and investigate the impact of selected predisposing risk factors on the age at sexual debut, either voluntary or coerced.

Methods

Study design

We conducted a prospective analysis of a sub-sample of the Birth to Twenty (Bt20) cohort data to address the study aim. Bt20 is a prospective longitudinal birth cohort conducted in Soweto, the largest urban township in Johannesburg, South Africa. As the largest and longest birth cohort in Africa it aims to assess the environmental, economic, psychosocial and biological determinants of health, development and well-being of children born in a South African urban township. The Bt20 started as Birth to Ten in April 1990 and after 10 years of follow up in 2000, the cohort study transitioned to continue the study into a second 10 years follow up (Richter et al., 2004). The cohort researchers intend to maintain the cohort up to third generation children (Richter et al., 2007).

Study setting

The Bt20 cohort includes singleton children born to women resident in Soweto-Johannesburg during the 7-week enrolment period from April 23 to June 8, 1990. Pregnant women in their third trimester were recruited while attending public antenatal clinics in Soweto and enrolled into the study prior to delivery. Due to

screening criteria, enrolled children had to remain in the area with the mother for at least 6 months post birth. 5447 births were registered during the 7-weeks enrolment period, of which 3273 of the children met the selection criteria of continued residence in the area. The children and their families have been followed up more than 18 times between birth and 23 years of age, with approximately 2 300 children and their families (70%) remaining in contact with the study. The study has been described in detail in The Cohort Profile (Richter et al., 2007).

Study participants

The study participants are a sample of 908 Black African female adolescents in the Bt20 cohort in Soweto, Johannesburg, South Africa. A majority of the participants in the Bt20 cohort are Black African children (78%) and there has been high attrition for Asians and Whites, thus testing for ethnic differences was not appropriate (Richter et al., 2007). Black African female adolescents have been identified as a key population at higher risk of early sexual debut, elevating their risk of STIs, HIV infection and unplanned teenage pregnancy. We selected Black African females who had not initiated penetrative sexual intercourse at the age of 13 years. The data we are using for this analysis was collected longitudinally at five points between 13 and 18 years of age. We selected information from 13 years because collection of sexual behaviour measures started prior to the year the adolescents turned 13 years. The dataset closes at the end of the year that the adolescents turned 18 years.

Research procedure and data collection

In the Bt20 cohort study, data collection comprised lengthy questionnaires, in-depth interviews and measures of special interest. Questionnaires were administered

verbally and face to face by trained interviewers fluent in the participants' home languages in a closed room to ensure privacy. The questionnaires were designed by several researchers and standardized instruments were used. Questionnaires were translated to main South African languages after piloting to establish reliability and validity. Interviewers and data collectors were trained on general research issues, ethical conduct, topics on working with children, and administration of questionnaires. Parents or guardians of the children in the cohort completed the questionnaires with assistance from trained interviewers. Information on risk behaviour was collected once when the participants turned 11-12 years and twice annually from the age of 13 years. Information on sexual behaviour was considered sensitive for children and therefore the Bt20 study used self-administered questionnaires to collect data on sexual behaviour. Study participants spend on average 3-4 hours completing the questionnaires. Data collection was done at the participant's home, school or study site.

Measurements

For this present study we used selected demographic measurements which were collected in the Bt20 cohort study. Socio-economic status (SES) was determined by constructing a score (high/medium/low) using housing type, ownership and a list of household assets ownership (such as TV, stove, refrigerator) (Vyas et al., 2006). Pubertal status was determined using tanner staging which was determined from adolescent self-assessment using a locally validated scale. The sexual behavior measurements were collected from age 11 years and all the subsequent visits thereafter. Sexual activity prior to 11 years was retrospectively reported. The sexual behavior measures include whether or not the child had experienced foreplay or oral

sex prior to 13 years of age, whether any of these sexual experiences were coerced (not including penetrative sexual intercourse) and the age of their sexual debut partner. First-time vaginal or anal intercourse was defined as sexual debut and the respective age of the child was recorded as the age of sexual debut. The age of sexual debut and whether the experience was voluntary or coerced were the outcome variables for this statistical analysis. Sexual behavior measures were self-reported responses submitted through a method of secret ballot (self-administered questionnaires) to ensure privacy, anonymity, self-disclosure and accuracy of the data. Age of partner at sexual debut was also collected.

Data analysis

Frequency distributions and relative frequencies are reported to describe the data. We used Chi-squared tests and Fishers exact tests to identify significant associations between categorical variables. We used logistic regression to investigate odds ratios and the associated significance. Cox Proportional Hazards regression analysis was conducted to examine the effect of potential risk factors on the time to overall sexual debut (Cox, 1972). We built the model by forward selection using AIC and variables which were statistically significant at $p\text{-value} < 0.1$ in bivariate analyses. We further explored the effect of these risk factors on time to first voluntary sexual debut and time to first coerced sexual debut respectively using the Fine and Gray competing risks method (Fine et al., 1999). Computed hazard ratios are reported with 95% confidence intervals. Statistical significance is indicated by $p\text{-values}$ less than 0.05. With lowered power for this secondary analysis, we will consider $p\text{-values}$ greater than 0.05 but less than 0.1 as approaching statistical significance. Stata statistical software (version 14) was used to analyze the data

(StataCorp., 2013) and R was used for graphical display (Therneau, 2015, Wickham, 2009).

Ethics considerations

Ethical approval for the Bt20 cohort study was obtained from the Human Research Ethics Committee of the University of Witwatersrand in Johannesburg. The study was conducted adhering to ethical principles stated in the Declaration of Helsinki and the Belmont Report. There was ethical clearance for each data collection wave from the University of Witwatersrand. Ethical approval for this present study was obtained from the Human Research Ethics Committee of the University of Witwatersrand in Johannesburg (certificate number: M010556) and Human Research Ethics Committee of the Faculty of Health Sciences at the University of Cape (HREC REF: 895/2016).

Sophisticated bar codes, filing and electronic systems are used for safe data storage. All data sets for the Bt20 study are password protected and can only be accessed through formal agreement with the principal investigator.

Results

A total of 908 Black African female adolescents were included in this present analysis. **Table 1** shows summary characteristics of study participants at age 13 years. The girls were predominantly from low SES (40%). Close to three quarters of the girls (74%) had mothers who had secondary schooling. Nearly 60% of the girls had early pubertal development. At least 20% of the girls had engaged in other

sexual activities (foreplay, oral sex or non-penetrative coercion) before they turned 13 years.

Table 1: Characteristics of study participants at the 13-year wave (N=908)

	Frequency (n)	Percent (%)
SES		
Low	365	40
Middle	209	23
High	142	16
Unspecified	192	21
Maternal Education		
Primary/No schooling	117	13
Secondary	671	74
Tertiary	64	7
Unspecified	56	6
Pubertal stages		
Pre-pubertal	52	6
Early pubertal	543	60
Late pubertal	213	23
Unspecified	100	11
Prior 13 years engagement in foreplay		
No	728	80
Yes	180	20
Prior 13 years engagement in oral sex		
No	897	99
Yes	11	1
Prior 13 years non-penetrative coercion		
No	590	65
Yes	46	5
Unspecified	272	30

Table 2 reports the results of sexual debut by the end of the 18-year wave. Overall, 370 girls (41%) experienced sexual debut during this follow up period, 290 (78%) of these sexual debut experiences were voluntary while 68 (18%) were coerced.

Appendix 1 tabulates the sexual debut survival of the girls from age 13 years up until 18 years. A total of 41% of girls who engaged in sexual intercourse by 18 years of age had low SES. Low SES had higher proportions of both voluntary and coerced sexual debut (40% and 46% respectively). About 16% of the girls who had voluntary

sexual debut were from a high SES while only 3% of the girls who had coerced sexual debut were from a high SES. From the girls who were coerced into sexual debut, 22% had mothers who had primary or no education. More than half (58%) of the girls who experienced sexual debut in the follow up time were in the early stages of pubertal development at age of 13 years. This is seen for both voluntary and coerced sexual debut (59% and 53% respectively). Most girls had sexual debut partners 1 to 4 years older (70%), regardless of their sexual experience. The prevalence of coerced sexual debut among girls with same age partners was 18%. From the 68 girls who experienced coerced sexual debut, 34% had prior engaged in foreplay and none engaged in oral sex. Overall, only 2% of the girls who had sexual debut had reported prior engagement in oral sex. Overall, 8% of sexually active girls experienced prior non-penetrative coercion. **Appendix 2** shows that first penetrative sexual intercourse and first oral sex occurred at the same time while most of the girls engaged in foreplay earlier than both sexual debut and oral sex.

Partner age difference

We investigated the association of sexual debut and age difference with sexual debut partner using logistic regression. We found that coerced sexual debut was 2.6 (0.9; 7.7) times as likely to occur in adolescents with partners of the same age than adolescents who initiated sex with age – disparate partners (p – value = 0.08).

Table 2: Descriptive statistics of variables at the 13-year wave by sexual debut until the 18-year wave (N= 908)

	Not yet engaged sex n (%)	*Overall engaged in sex n (%)	**p-value	Voluntar y sexual debut n (%)	Coerced sexual debut n (%)	**p-value
Total	538 (59)	370 (41)		290 (32)	68 (8)	
Socioeconomic status						
Low	210 (39)	148 (41)	0.70	117 (40)	31 (46)	0.54
Middle	124 (23)	81 (23)	-	67 (23)	14 (21)	0.87
High	93 (17)	49 (14)	0.64	47 (16)	2 (3)	0.61
Unspecified	111(21)	80 (22)		59 (21)	21 (31)	
Maternal Education						
Primary/None	63 (12)	53 (15)	0.63	38 (13)	15 (22)	0.41
Secondary	400 (74)	260 (73)	0.78	218 (75)	42 (62)	0.08
Tertiary	38 (7)	26 (7)	-	21 (7)	5 (7)	-
Unspecified	37 (7)	19 (5)		13 (5)	6 (9)	
Pubertal stages						
Pre-pubertal	36 (7)	15 (4)	0.04	13 (5)	2 (3)	0.90
Early pubertal	329 (61)	208 (58)	0.49	172 (59)	36 (53)	0.51
Late pubertal	113 (21)	96 (27)	0.31	82 (28)	14 (21)	0.58
Unspecified	60 (11)	39 (11)		23 (8)	16 (23)	
Age difference with sexual debut partner						
Partner younger	-	3 (1)	-	3 (1)	0(0)	-
Partner same age	-	44 (12)	-	32 (11)	12 (18)	0.53
Partner 1-4 years older	-	251 (70)	-	204 (70)	47 (69)	0.89
Partner 5 or more years older	-	48 (13)	-	42 (15)	6 (9)	0.69
Unspecified	-	12 (4)	-	9 (3)	3 (4)	
Prior engagement in foreplay						
No	460 (85)	259 (72)	0.002	214 (74)	45 (66)	0.27
Yes	78 (15)	99 (28)	0.04	76 (26)	23 (34)	0.45
Prior engagement in oral sex						
No	534(99)	351 (98)	0.20	283 (98)	68(100)	0.24
Yes	4 (1)	7 (2)	0.60	7 (2)	0(0)	
Prior non-penetrative coercion						
No	352 (65)	230 (64)	0.80	201 (69)	29 (43)	0.006
Yes	16 (3)	30 (9)	<0.001	24 (8)	6 (9)	0.93
Unspecified	170 (32)	98 (27)		65 (23)	33 (48)	

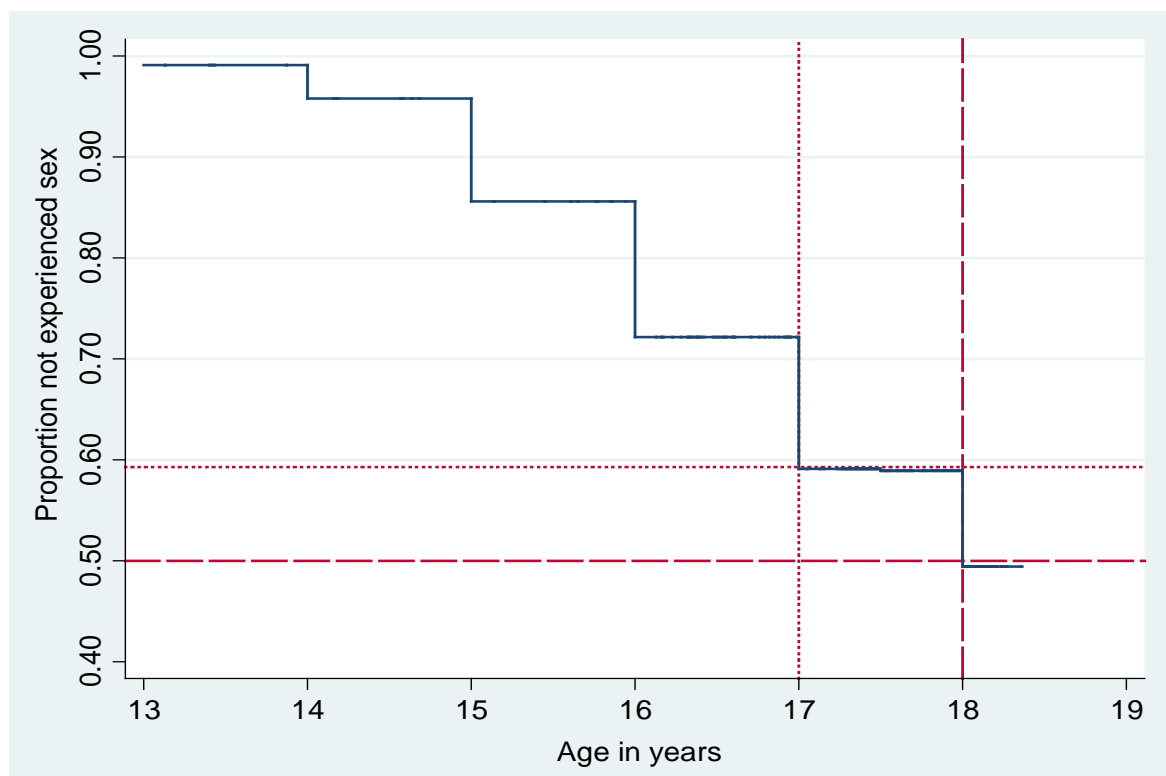
*Overall engaged in sex included 12 girls who stated that they engaged in first sex but did not specify whether it was voluntary or coerced

** statistical testing

Age of sexual debut and sexual experience

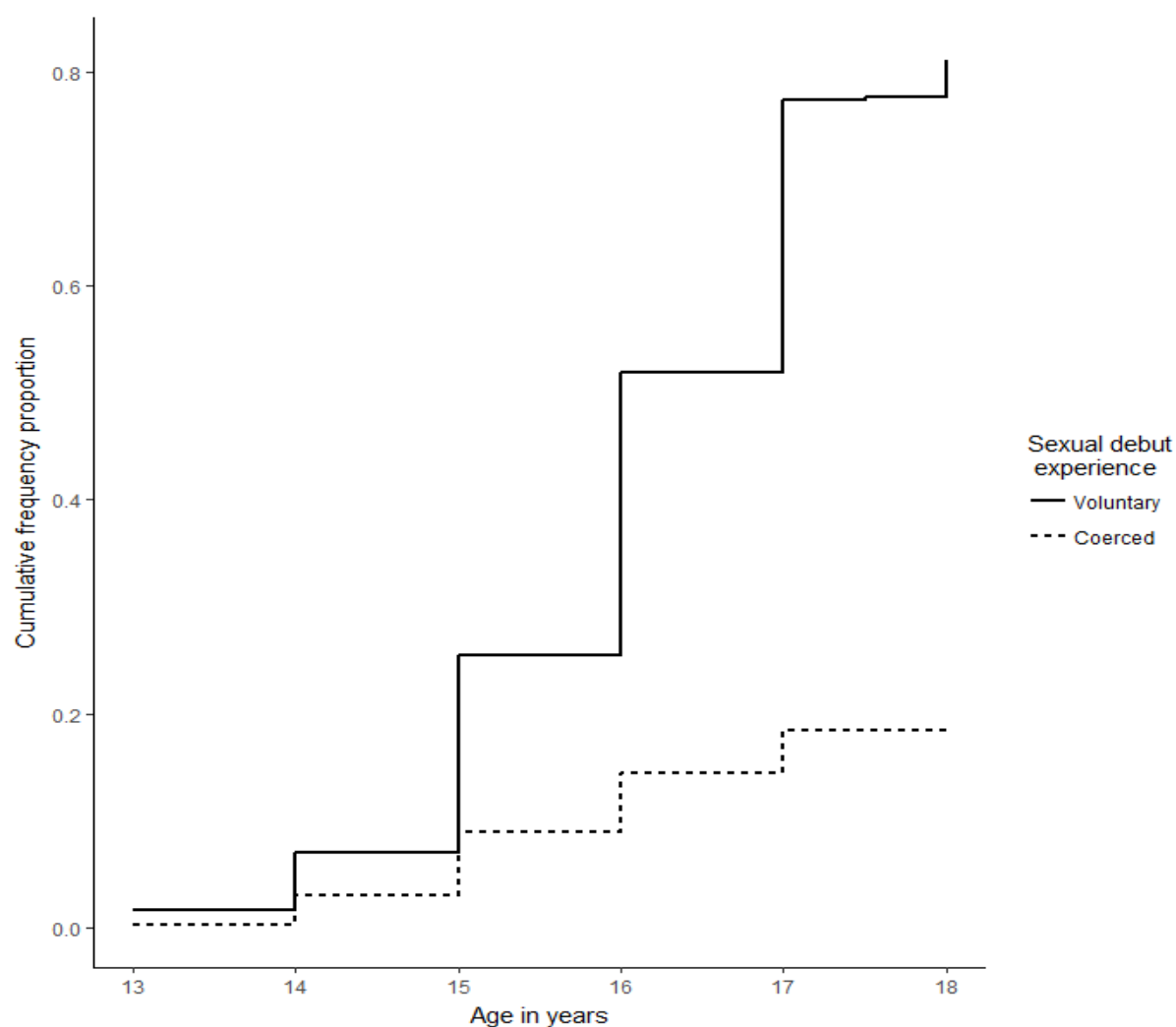
In **Figure 1**, we can see that two in five girls, (40%) of the sample had experienced sexual debut by 17 years. The curve is steeper between 14 to 17 years. More than a quarter of the girls (about 27%) had experienced sexual debut by age 16 years. The overall median age of sexual debut was 18 years.

Figure 1: Survival curve of proportion of girls not yet engaged in sex.



In **Figure 2**, we can note that over the follow up period (13 to 18 years), the rate at which voluntary sexual debut increases appears to be faster than the rate at which coerced sexual debut increases. Sexual debut more than doubled between the ages 14 and 15 years and also between 15 and 16 years. The observed increase in these age groups is for both voluntary and coerced sexual debut. Voluntary sexual debut graph becomes very steep between the ages 15 to 18 years.

Figure 2: Predicted cumulative incidence of voluntary and coerced sexual debut



Univariate analysis

In the univariate regression analyses, all factors except maternal education and age difference with sexual debut partner were statistically significant at the 10% level of significance (**Table 3**). Girls with high SES were less likely to report early sexual debut compared to those with low SES, with crude hazard ratio of 0.76 (0.55; 1.05). Girls at a later stage of pubertal development prior to 13 years were 1.68 (0.99; 2.85) times more likely to engage in first sex over time compared to girls who were in the pre-pubertal stages. Engagements in foreplay, oral sex and non-penetrative coercion prior to 13 years of age had increased risk of sexual debut. Engaging in any sexual

activity prior to 13 years made girls almost twice as likely to engage in first sex over time.

Table 2: Univariate and multivariate associations with overall sexual debut

Covariate	Univariate analysis		Multivariate analysis	
	HR (95% CI)	p-value	HR (95% CI)	p-value
SES				
Low	1.00		1.00	
Middle	0.93 (0.71; 1.21)	0.59	0.90 (0.67; 1.22)	0.51
High	0.76 (0.55; 1.05)	0.09	0.75 (0.52; 1.07)	0.10
Maternal Education				
Primary/None	1.00			
Secondary	0.82 (0.61; 1.09)	0.18	-	-
Tertiary	0.81 (0.51; 1.29)	0.38	-	-
Pubertal stages				
Pre-pubertal	1.00		1.00	
Early pubertal	1.31 (0.79; 2.18)	0.30	1.14 (0.62; 2.07)	0.67
Late pubertal	1.68 (0.99; 2.85)	0.05	1.35 (0.72; 2.55)	0.35
Prior 13 years engagement in foreplay				
No	1.00		1.00	
Yes	1.83 (1.46; 2.31)	<0.01	1.55 (1.13; 2.14)	0.01
Prior 13 years engagement in oral sex				
No	1.00		1.00	
Yes	2.09 (0.99; 4.42)	0.05	3.57 (1.45; 8.81)	0.01
Prior 13 years non-penetrative coercion				
No	1.00		1.00	
Yes	2.09 (1.43; 3.06)	<0.01	1.61 (1.03; 2.51)	0.03
Age difference with sexual debut partner				
Partner younger	0.69 (0.21; 2.22)	0.54	-	-
Same age	0.72 (0.49; 1.09)	0.12	-	-
Partner 1 to 4 years older	0.91 (0.67; 1.23)	0.54	-	-
Partner 5 years and more older	1.00			
HR - Hazard ratio				
95% CI - 95% Confidence interval				

Multivariate analysis

In multivariate analysis, the hazards for sexual debut were not statistically significant for SES and age difference with sexual debut partner after adjusting for the other risk factors (prior to 13 years engagements in foreplay, oral sex and non-penetrative coercion) (**Table 3**). Prior engagement in any form of non-penetrative sexual activity increased the risk of sexual debut after controlling for the other risk factors in the adjusted model. Girls who had prior engagement in foreplay at age 13 years were more likely to experience sexual debut within the follow up period compared to girls who had not engaged in foreplay with a hazard ratio of 1.55 (1.13; 2.14). Girls who had engaged in oral sex prior 13 years had a hazard of 3.57 (1.45; 8.81) to experience sexual debut compared to girls who had not engaged in oral sex. Girls who had prior engagement in non-penetrative coercion were more likely to experience sexual debut compared to girls who had not experienced non-penetrative coercion.

Another model was fit to account for competing risks (voluntary sexual debut and coerced sexual debut) and the multivariate results are shown in **Table 4**. The effect of SES for coerced sexual debut was noticeably large, a hazard ratio of 0.23 (0.04, 1.40). Low maternal education was associated with earlier coerced sexual debut, hazard ratio of 0.37 (0.14; 1.00) but there was no significant association with voluntary sexual debut. Female adolescents whose mothers have lower levels of education were more likely to report coerced sexual debut compared to those with mothers who finished secondary education. Experiencing puberty development early was associated with voluntary sexual debut with a hazard ratio of 1.67 (0.90; 3.12). Prior engagements in foreplay and non-penetrative coercion had no association with either voluntary or coerced sexual debut. The hazard of voluntary sexual debut was

higher for girls who had prior engagements in oral sex than those who did not have prior experience, hazard ratio 2.71 (1.53; 4.79) but not significant for coerced sexual debut. By 18 years of age, the hazard of voluntary sexual debut for girls with partners of same age was far lower than in girls in age disparate relationships (partner 5 years older or more).

Table 3: Hazard ratios for competing risks (voluntary or coerced sexual debut)
Multivariate analysis

Covariate	Voluntary sexual debut		Coerced sexual debut	
	HR (95% CI)	p-value	HR (95% CI)	p-value
SES				
Low	1.00		1.00	
Middle	0.93 (0.70; 1.24)	0.63	1.21 (0.48; 3.01)	0.69
High	1.21 (0.92; 1.59)	0.16	0.23 (0.04; 1.40)	0.10
Maternal Education				
Primary/None	1.00		1.00	
Secondary	1.25 (0.85; 1.85)	0.26	0.37 (0.14; 1.00)	0.05
Tertiary	1.02 (0.59; 1.76)	0.09	0.35 (0.04; 2.74)	0.32
Pubertal stages				
Pre-pubertal	1.00		1.00	
Early pubertal	1.34 (0.74; 2.40)	0.32	0.68 (0.15; 3.00)	0.61
Late pubertal	1.67 (0.90; 3.12)	0.10	0.87 (0.17; 4.54)	0.87
Prior 13 years engagement in foreplay				
No	1.00		1.00	
Yes	1.24 (0.91; 1.70)	0.18	1.92 (0.69; 5.40)	0.21
Prior 13 years engagement in oral sex				
No	1.00		1.00	
Yes	2.71 (1.53; 4.79)	<0.01	-	-
Prior 13 years non-penetrative coercion				
No	1.00		1.00	
Yes	0.86 (0.54; 1.38)	0.54	1.37 (0.45; 4.20)	0.58
Partner age at sexual debut				
Partner younger	0.95 (0.40; 2.22)	0.90	-	-
Same age	0.58 (0.36; 0.94)	0.02	2.70 (0.57; 12.56)	0.21
Partner 1 to 4 years older	0.79 (0.57; 1.10)	0.17	1.81 (0.53; 6.25)	0.34
Partner 5 years and more older	1.00		1.00	

Discussion

This study assessed the risk of sexual debut (voluntary or coerced) by 18 years of age among 908 Black African female adolescents who had not experienced sexual intercourse by the age of 13 years. During the follow-up period, a total of 370 (41%) experienced sexual debut during this follow up period, 290 (78%) of these sexual debut experiences were voluntary while 68 (18%) were coerced. About 4% of the girls did not specify whether their sexual debut was voluntary or coerced. High SES and engagement in any form of non-penetrative sexual activity prior to 13 years significantly impacted on the risk of sexual debut. High SES reduce the risk by 25% compared low SES while engaging in non-penetrative sexual activity prior to 13 years increased the risk of sexual debut. In competing risks analysis, the hazard of coerced sexual debut decreased by 77% for girls from high SES compared to those from low SES and by 63% for girls with mothers who had attained secondary education compared to primary or no schooling.

The overall sample median age of sexual debut was 18 years, which is comparable to other studies in Sub Saharan Africa and South Africa (Shisana et al., 2009, Zuma et al., 2011). This is in contrast with estimates of median age at sexual debut for females from other studies in South Africa of about 17 years (Chirinda et al., 2012, Pettifor et al., 2009). The variation in these estimates can be due to sample types, recalled age of first sexual intercourse and also lack of appropriate use of survival analyses techniques for the ages of participants and time to sexual debut.

The association between SES and sexual debut experience has been noted in other studies from South Africa (Chirinda et al., 2012, Mathews et al., 2009, Peltzer,

2010). In further exploration using competing risks, girls with high SES had 77% reduced hazard of coerced sexual debut compared to low SES. It could be that girls from poorer families are coerced into early sexual debut for financial and material benefits. However it is also likely that SES with an index based on household assets may be an inappropriate measure because most people in the townships own household assets. If quality of assets owned was captured, then a better construct could have been created (Vyas et al., 2006).

Maternal education was also associated with coerced sexual debut. Female adolescents with mothers who had completed secondary education had a 63% reduced hazard of coerced sexual debut compared to girls with mothers who had primary or no education. This is probably because mothers are a significant source of information for adolescent girls (Moore et al., 2007) and mothers with a better education qualification may be likely to maintain a good relationship with their daughters and have been reported to disapprove of early sexual activities (Mathews et al., 2009). A study in South Africa found that poor parental supervision was associated with early sexual debut (Peltzer, 2010). Mothers with primary or no schooling are also likely to be out working for money to support the family hence less supervision on their children.

In our study, nearly 20% of sexual debut experiences involved sexual coercion. There have been several studies which found early coerced sexual debut among adolescents, especially female adolescents in South Africa (Chirinda et al., 2012, Maharaj et al., 2007, Mathews et al., 2009, Pettifor et al., 2009). In most studies, sexual coercion was found to be significantly associated with partners 5 years or

older (Maharaj et al., 2007, Moore et al., 2007, Pettifor et al., 2009). In contrast, we observed experiences of sexual coercion among same-aged partners. This is consistent with findings from another study in South Africa where about 92% of those who had early sexual debut was with a sexual partner within 0 to 5 years from their age (Zuma et al., 2010). However, age difference with sexual debut partner was not significantly associated with coerced sexual debut in the competing risk model. Due to the smaller numbers of teenagers reporting sexual coercion, there was reduced power and some significant effects may not have been identified. Introduction of school based interventions to delay sexual debut should also target prevention of sexual coercion to be done at an earlier age before children engage in sexual activities.

This study is a prospective longitudinal design collecting data for both voluntary and coerced sexual debut experiences. It is the only prospective birth cohort study in South Africa that has collected sexual behaviour measures allowing for establishment of temporality on determinants for sexual debut. Using competing risk models enabled us to examine risk factors on time to voluntary and coerced sexual debut in detail. Due to the smaller numbers of teenagers reporting sexual coercion, there was reduced power and some significant effects may not have been identified as a result. The outcome variable for our study, sexual debut, included first-time vaginal or anal intercourse. It would be helpful to know the type of first time intercourse because of the different consequences they have to adolescents' sexual and reproductive health. Anal sex increases risk of HIV but has a reduced risk of unplanned pregnancy yet vaginal sex increases risk of unplanned pregnancy (Chirinda et al., 2012, Pettifor et al., 2009).

Our analyses did not include other risk factors such as religion, school attendance status, parental survival status and self-esteem which have been shown to be associated with sexual debut. There could be potential bias in self-report of sexual behaviour experiences due to social desirability and under reporting of stigmatized sexual behaviours (Pettifor et al., 2009, Zuma et al., 2011). Some girls may have reported incorrect ages at sexual debut due to social acceptability bias when the actual ages were lower. Intentional deception is a source of bias that cannot easily be identified (Peltzer, 2010, Setswe et al., 2010). Possibly, many of the girls may have reported voluntary sexual debut if they were in age disparate relationships where they were getting favours in form of gifts and financial benefits instead of reporting coerced sexual debut. We did not analyse sexual experiences, sexual relationships and feelings of the girls after their first time sexual intercourse.

Conclusion

There is a need for interventions to target parents and children in households from low SES backgrounds, and mothers with lower levels of education. Interventions for teenagers should aim to delay sexual debut, both voluntary and coerced by focusing on relationships between peers and identifying children with prior sexual experiences. This will help prevent unwanted consequences of early initiation of sex, like unplanned pregnancies and sexually transmitted infections and could potentially decrease the incidence of HIV in this particular key population. More research is needed to know effects of coerced sexual debut and behavioural well-being of young adolescents after their first time sexual intercourse.

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Part D: Appendices

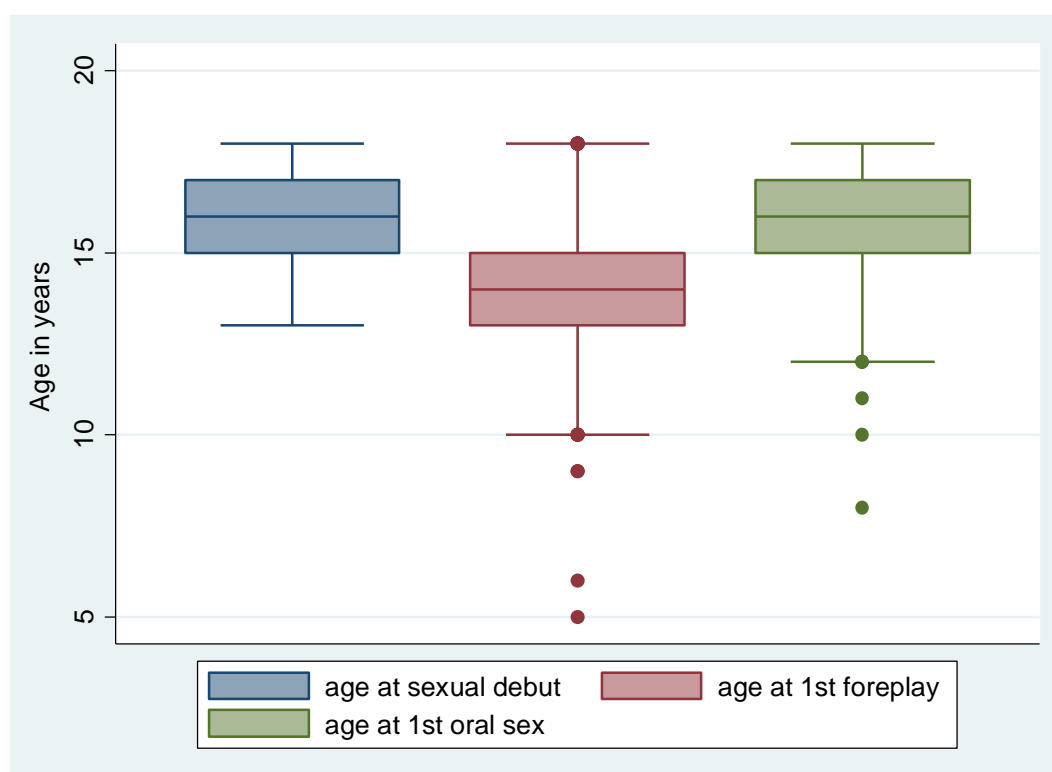
Appendix 1: Additional data table

Table A 1: Descriptive statistics of Black African female adolescents from 13-year wave until the 18-year wave (N= 908)

	Not yet engaged sex n (%)	Voluntary sexual debut n (%)	Coerced sexual debut n (%)	Unspecified sexual debut n (%)	Overall engaged in sex n (%)
Age at first sex					
≤ 13 years	900 (99)	6 (1)	1 (0.1)	1 (0.1)	8 (1)
≤ 14 years	870 (96)	25 (3)	11 (1)	2 (0.2)	38 (4)
≤ 15 years	779 (86)	91 (10)	32 (4)	6 (1)	129 (14)
≤ 16 years	660 (73)	186 (21)	52 (6)	10 (2)	248 (27)
≤ 17 years	553 (61)	277 (31)	66 (7)	12 (2)	355 (39)
≤ 18 years	538 (59)	290 (32)	68 (8)	12 (2)	370 (41)

Appendix 2: Distribution of sexual activities by the 18-year wave

Figure A 1: Boxplots of age of sexual debut and first non-penetrative sexual activities



Appendix 3: Ethics approval letter



UNIVERSITY OF CAPE TOWN
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14 December 2016

HREC REF: 895/2016

Mr J Ramjith
Public Health & Family Health
Level 5
Falmouth Building

Dear Mr Ramjith

PROJECT TITLE: DETERMINANTS OF VOLUNTARY OR COERCED SEXUAL DEBUT AMONG BLACK FEMALE ADOLESCENTS IN SOWETO, SOUTH AFRICA: FINDINGS FROM THE BIRTH TO TWENTY PLUS (Bt20) COHORT STUDY- MPH candidate Nyemba Dorothy

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee for review.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

Approval is granted for one year until the 30th December 2017.

The HREC note that any secondary data analysis will occur from data collected from an approved WITS FHS protocol.

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.

(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

We acknowledge that the student Dorothy Nyemba will be involved in this study.

Please note that for all studies approved by the HREC, the principal investigator **must** obtain appropriate institutional approval before the research may occur.

Please quote the HREC REF in all your correspondence.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Yours sincerely

Signed

PROFESSOR M BLOCKMAN
CHAIRPERSON, FHS HUMAN RESEARCH ETHICS COMMITTEE

HREC 895/2016

Appendix 4: Informed consent form

INFORMED CONSENT

I agree to myself being a participant in the Birth to Twenty study.

The goals and methods of Birth to Twenty are clear to me.

I understand that the study will involve interviews. All the details and purposes of this study have been explained to me. I understand that I have the right to refuse to participate in the study.

I agree to participation in the study on the condition that:

1. I can withdraw from the study at any time voluntarily and that no adverse consequences will follow on withdrawal from the study.
2. I have the right not to answer any or all questions posed in the interviews and not to participate in any or all of the procedures / assessments.
3. The University of the Witwatersrand Human Ethics committee has approved the study protocol and procedures.
4. All results will be treated with the strictest confidentiality.
5. Only group results, and not my individual results, will be published in scientific journals and in the media.
6. The Bt20 scientific team are committed to treating participants with respect and privacy through interviews conducted in private and follow-up counselling available on request.
7. I will receive a referral note to a health service if any result is out of the normal range or a problem is detected in the course of the study.

PARTICIPANT (Young Adult)

Printed Name

Signature / Mark or Thumbprint

Date and Time

Appendix 5: Author Guidelines

South African Medical Journal: Submissions

COPYRIGHT

Material submitted for publication in the South African Medical Journal (SAMJ) is accepted provided it has not been published elsewhere. The SAMJ reserves copyright of the material published.

The SAMJ does not hold itself responsible for statements made by the authors.

AUTHORSHIP

All named authors must give consent to publication. Authorship should be based only on substantial contribution to: (i) conception, design, analysis and interpretation of data; (ii) drafting the article or revising it critically for important intellectual content; (iii) final approval of the version to be published. All three of these conditions must be met (Uniform requirements for manuscripts submitted to biomedical journals; www.icmje.org/index.html).

CONFLICT OF INTEREST

Authors must declare all sources of support for the research and any association with the product or subject that may constitute conflict of interest.

PROTECTION OF PATIENT'S RIGHTS TO PRIVACY

Identifying information should not be published in written descriptions, photographs, and pedigrees unless the information is essential for scientific purposes and the patient (or parent or guardian) gives informed written consent for publication.

Informed consent for this purpose requires that the patient be shown the manuscript to be published. (www.icmje.org)

ETHNIC CLASSIFICATION

Work that is based on or contains reference to ethnic classification must indicate the rationale for this.

MANUSCRIPTS

Short items are more likely to appeal to our readers and therefore to be accepted for publication.

Original articles of 3 000 words or less, with up to 6 tables or illustrations, should normally report observations or research of relevance to clinical medicine.

References should preferably be limited to no more than 15.

Guideline word limit: 4 000 words

Research articles describe the background, methods, results and conclusions of an original research study. The article should contain the following sections:

introduction, methods, results, discussion and conclusion, and should include a structured abstract (see below). The introduction should be concise – no more than three paragraphs – on the background to the research question, and must include references to other relevant published studies that clearly lay out the rationale for conducting the study. Some common reasons for conducting a study are: to fill a gap in the literature, a logical extension of previous work, or to answer an important clinical question. If other papers related to the same study have been published

previously, please make sure to refer to them specifically. Describe the study methods in as much detail as possible so that others would be able to replicate the study should they need to. Results should describe the study sample as well as the findings from the study itself, but all interpretation of findings must be kept in the discussion section, which should consider primary outcomes first before any secondary or tertiary findings or post-hoc analyses. The conclusion should briefly summarise the main message of the paper and provide recommendations for further study.

Select figures and tables for your paper carefully and sparingly. Use only those figures that provided added value to the paper, over and above what is written in the text.

Do not replicate data in tables and in text .

Structured abstract

- This should be 250-400 words, with the following recommended headings:
 - **Background:** why the study is being done and how it relates to other published work.
 - **Objectives:** what the study intends to find out
 - **Methods:** must include study design, number of participants, description of the intervention, primary and secondary outcomes, any specific analyses that were done on the data.
 - **Results:** first sentence must be brief population and sample description; outline the results according to the methods described.

Primary outcomes must be described first, even if they are not the most significant findings of the study.

- **Conclusion:** must be supported by the data, include recommendations for further study/actions.
- Please ensure that the structured abstract is complete, accurate and clear and has been approved by all authors.
- Do not include any references in the abstracts.

[Here](#) is an example of a good abstract.

Main article

All articles are to include the following main sections: Introduction/Background, Methods, Results, Discussion, Conclusions.

The following are additional heading or section options that may appear within these:

- Objectives (within Introduction/Background): a clear statement of the main aim of the study and the major hypothesis tested or research question posed
- Design (within Methods): including factors such as prospective, randomisation, blinding, placebo control, case control, crossover, criterion standards for diagnostic tests, etc.
- Setting (within Methods): level of care, e.g. primary, secondary, number of participating centres.
- Participants (instead of patients or subjects; within Methods): numbers entering and completing the study, sex, age and any other biological, behavioural, social or cultural factors (e.g. smoking status, socioeconomic group, educational attainment, co-existing disease indicators, etc) that may

have an impact on the study results. Clearly define how participants were enrolled, and describe selection and exclusion criteria.

- Interventions (within Methods): what, how, when and for how long. Typically for randomised controlled trials, crossover trials, and before and after studies.
- Main outcome measures (within Methods): those as planned in the protocol, and those ultimately measured. Explain differences, if any.

Results

- Start with description of the population and sample. Include key characteristics of comparison groups.
- Main results with (for quantitative studies) 95% confidence intervals and, where appropriate, the exact level of statistical significance and the number need to treat/harm. Whenever possible, state absolute rather than relative risks.
- Do not replicate data in tables and in text.
- If presenting mean and standard deviations, specify this clearly. Our house style is to present this as follows:
- E.g.: The mean (SD) birth weight was 2 500 (1 210) g. Do not use the \pm symbol for mean (SD).
- Leave interpretation to the Discussion section. The Results section should just report the findings as per the Methods section.

Discussion

Please ensure that the discussion is concise and follows this overall structure – sub-headings are not needed:

- Statement of principal findings

- Strengths and weaknesses of the study
- Contribution to the body of knowledge
- Strengths and weaknesses in relation to other studies
- The meaning of the study – e.g. what this study means to clinicians and policymakers
- Unanswered questions and recommendations for future research

Conclusions: This may be the only section readers look at, therefore write it carefully. Include primary conclusions and their implications, suggesting areas for further research if appropriate. Do not go beyond the data in the article.